What is claimed is:

1. A Fourier transform processor comprising:

    a)   an input sample delivery circuit for delivering a sample set of a one of N_f time domain samples and N_f frequency domain samples in a row and column order;

    b)   at least one row and column circuit with an input and an output, and the row and column circuit performing a row and column transform on complex valued samples at the input to produce at the output coefficients corresponding with an other of the time domain and the frequency domain; and

    c)   at least one sliced radix circuit of order "R" with R parallel inputs coupled to said input sample delivery circuit and an output coupled to the input of said at least one row and column circuit, and said at least one sliced radix circuit transforming N_f/R input samples from the sample set into a selected one among the R possible complex outputs and the deliveries of the sample set to said at least one sliced radix circuit corresponding in a number with the number of remaining ones among the R possible complex outputs.

2. The Fourier transform processor of Claim 1, wherein said input sample delivery circuit further comprises:

    a downstream communication circuit for processing downstream packets each including a respective frequency domain sample set of a portion of a channel of data destined for a subscriber;

    an upstream communication circuit for processing upstream packets each including a respective time domain sample set of a portion of a channel of data from a subscriber; and

    an input memory for consecutive delivery of each of said sample sets.

3. The Fourier transform processor of Claim 2, wherein said input sample delivery circuit further comprises:

    logic for correlating the upstream packets and downstream packets with a corresponding protocol together with a variable size N_f of each of the sample sets on the basis of a corresponding indicia within each of the upstream and downstream packets; and

    logic for configuring each of said at least one row and column circuit together with said at least one sliced radix circuit responsive to the correlating of said logic for correlating.

4. The Fourier transform processor of Claim 2, wherein the downstream packets and upstream packets collectively include more than one X-DSL communication protocol.

5. The Fourier transform processor of Claim 1, wherein said input sample delivery circuit further comprises:

logic for folding the set of N_f samples into a first two dimensional array of Y rows and X columns;

logic for decomposing each of the Y rows into a second two dimensional array with R columns corresponding in a number with the order of the radix and Z rows, and with each of the Z rows comprising one of the selected subsets and with each sample within each of the Z rows corresponding with an interleaving of a corresponding one of the Y rows at a sample separation substantially equal to X/R.

6. The Fourier transform processor of Claim 1, wherein said input sample delivery circuit further comprises:

logic for determining that a sample set of N_i samples includes exclusively real valued time domain samples; and

logic for compressing the sample set to N_f samples by expressing corresponding pairs of real values samples as a single complex valued sample, wherein N_f substantially equals half of N_i.

7. The Fourier transform processor of Claim 1, wherein said input sample delivery circuit further comprises:

logic for determining that the sample set includes frequency domain samples which exhibit hermetian symmetry; and

logic for limiting the sample set to include only N_f samples by excluding any mirror reversed conjugates there from.

8. The Fourier transform processor of Claim 5, wherein said at least one row and column circuit includes:

a first row and column circuit coupled to the output of said first sliced radix; and

a second row and column circuit coupled to the output of said second sliced radix.

9.   The Fourier transform processor of Claim 1, wherein said at least one row and column circuit further performs a row transform of an order X and a column transform of an order X + R.

10.   The Fourier transform processor of Claim 1, wherein said at least one sliced radix circuit includes:

a first sliced radix circuit of the order R with R parallel inputs coupled to said input sample delivery circuit and an output, and said first sliced radix circuit transforming N_f/R input samples from the sample set into a first selected one among the R possible complex outputs; and

a second sliced radix circuit of the order R with R parallel inputs coupled to said input sample delivery circuit and an output, and said second sliced radix circuit transforming N_f/R input samples from the sample set into a second selected one among the R possible complex outputs.

11.   The Fourier transform processor of Claim 1, wherein said at least one sliced radix circuit includes:

a summer with R parallel inputs and an output, and the summer summing all of the parallel inputs to generate the output;

scalars for scaling requisite ones of the R parallel inputs to said by a selected one of the R subsets of scale factors associated with a radix R transform;

a multiplier for multiplying sums output by said summer by a corresponding twiddle factor to produce the selected one among the R complex outputs.

12.   A method for computing a two dimensional Fourier transform, and the method comprising the acts of:

selecting a sample set of N_f samples corresponding with a one of a frequency domain and a time domain;

generating sliced radix transforms of an order R for each of N_f/R selected subsets of the sample set, with each subset including R samples and with a slice corresponding

with a radix R transformation of the R inputs from each of the selected subsets to a selected one among R complex outputs;

completing row and column transforms on the complex outputs generated in said act of generating; and

repeating the generating and completing acts for each of a remaining ones of the R complex outputs, to transform the N_f samples of the sample set to the other of the frequency domain and the time domain.

13.   The method of Claim 12, wherein the selecting act further comprises the acts of:

accepting upstream packets each including time domain samples and downstream packets each including frequency domain samples and each of the upstream and downstream packets corresponding with selected ones of a plurality of upstream channels of data and downstream channels of data respectively; and

correlating each of the upstream packets and downstream packets with a corresponding protocol together with a size N_f of the sample set on the basis of a corresponding indicia within each of the upstream and downstream packets.

14.   The method of Claim 13, wherein the corresponding protocols correlated in said correlating act include X-DSL protocols.

15.   The method of Claim 12, wherein the selecting act further comprises:

successively selecting sample sets of both varying sample sizes N_f and domain characteristics.

16.   The method of Claim 12, wherein the selecting act further comprises the acts of:

determining that a sample set of N_i samples includes exclusively real valued time domain samples; and

compressing the sample set to N_f samples by expressing corresponding pairs of real values samples as a single complex valued sample, wherein N_f substantially equals half of N_i.

17.   The method of Claim 12, wherein the selecting act further comprises the acts of:

determining that the sample set includes frequency domain samples which exhibit hermetian symmetry; and

limiting the sample set to include only N_f samples by excluding any mirror reversed conjugates there from.

18.   The method of Claim 12, wherein the selecting act further comprises the acts of:

folding the set of N_f samples into a first two dimensional array of Y rows and X columns;

decomposing each of the Y rows into a second two dimensional array with R columns corresponding in a number with the order of the radix and Z rows, and with each of the Z rows comprising one of the selected subsets and with each sample within each of the Z rows corresponding with an interleaving of a corresponding one of the Y rows at a sample separation substantially equal to X/ R.

19.   The method of Claim 12, wherein said generating act further comprises the acts of:

selecting from a set of R_1^2 scale factors associated with a radix R transform a selected subset with R_1 scale factors;

multiplying each of the R samples within the N_f / R subsets by a corresponding one of R scale factors within the selected subset;

summing products of each of the multiplications in said act of multiplying; and

multiplying resultants of said summing act by a corresponding twiddle factor to produce the selected one among the R complex outputs.

20.   The method of Claim 12, wherein said completing act further comprises the acts of:

configuring the row and column transforms to correspond with a number of samples N_f in the sample set.

21.   The method of Claim 12, wherein said completing act further comprises the acts of:

correlating the sample set with one of a frequency domain and a time domain;

varying the row and column transforms responsive to the correlating act.